

Kunal Mooley

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Education

- **M.Sc. and Ph.D. Astrophysics, Caltech and NRAO** 10/2009 – 03/2015
Thesis: The Dynamic Radio Sky
Advisors: Prof. Shrinivas Kulkarni, Prof. Gregg Hallinan, Dr. Dale Frail, Dr. Steven Myers
- **M.Sc. Physics, Indian Institute of Technology Bombay, India** 08/2007 – 06/2009
Thesis: X-ray Studies of Old Star Clusters
Advisors: Prof. S. Umashankar, Prof. Kulinderpal Singh (TIFR/IIT Bombay)
- **B.Sc. Physics, Fergusson College Pune, India** 09/2004 – 05/2007
Thesis: Stellar Evolution in Globular Clusters
Advisors: Prof. R. Srianand, Dr. Vijay Mohan (IUCAA)

Research Positions

- **Research Scientist, Caltech** 12/2020 – Present
Compact Objects, Transients and Multi-messenger Astronomy
- **Jansky Postdoctoral Fellow, NRAO and Caltech** 01/2018 – 12/2020
Gravitational-Wave Multi-messenger Astronomy. Radio transients.
Advisors: Dr. Dale Frail, Prof. Gregg Hallinan.
- **Hintze Postdoctoral Fellow, University of Oxford** 04/2015 – 12/2017
Jets in accreting black holes, neutron stars and white dwarfs.
Advisors: Prof. Robert Fender.
- **Grote Reber Fellow and Grad. Research Assistant, NRAO/Caltech** 09/2012 – 09/2014
Radio transients with joint radio and optical surveys (Ph.D. thesis).
- **Grad. Summer Research, GBT and CARMA Observatories** 06/2011 – 08/2011
Radio/sub-mm studies of molecular clouds and PMS stars.
Advisors: Dr. B. Mason, Dr. J. Carpenter.
- **Research Project Staff, TIFR, India** 06/2009 – 10/2009
X-ray and UV studies of accreting white dwarfs.
Advisor: Prof. Kulinderpal Singh.
- **Undergraduate Summer Research Fellow, IUCAA, India** 06/2008 – 08/2008
Probing time variation of fundamental constants using quasar abs. lines.
Advisor: Prof. R. Srianand.

Research Highlights/Achievements

- **Led/co-led the JAGWAR worldwide collaboration** since 2016, coordinating >25 members and 15 publications (including 4 Nature/Science papers) studying radio afterglows of gravitational wave events. e.g. [Hallinan, Corsi, Mooley+2017](#), [Mooley+2018a](#), [Mooley+2018b](#), [Bhakta+2021](#).
- **Implemented a new observing mode (On-The-Fly Mosaicing) at the Very Large Array**, in 2012/13, which has substantially increased the efficiency and survey capability of the telescope. [Mooley+2019](#). This mode has facilitated the ongoing VLA Sky Survey [Lacy+2019](#).
- **Co-developed a new data-processing technique** for large volumes of radio survey data [Bourke, Mooley & Hallinan 2014](#), [Mooley+2016](#).
- **Opened up a unique phase space for astrophysical transients** by executing wide-field radio surveys with the VLA. Led to the discovery of radio supernovae, tidal disruption events, orphan GRB afterglow and AGN with new jet activity. e.g. [Mooley+2016](#), [Anderson+2019](#), [Wolowska+2019](#), [Mooley+2021](#).

Fellowships, Awards & Honors

- Nominee for the IUPAP Young Scientist Prize, 2019
- American Association for the Advancement of Science (AAAS) Travel Award, 2019 (USD 1,000)
- Jansky Fellowship, 2018–2020
- University of Oxford Hintze Fellowship, 2015–2017
- University of Oxford Brasenose College Fellowship, 2015/16
- NRAO Grote Reber Fellowship, 2012–2014
- IIT Bombay Graduate Silver Medal, 2009
- IUCAA, India, Junior Research Fellowship, 2009 (waived)
- IIT M.Sc. Joint Admissions Examination Rank 10 (India-wide), 2007
- Loyola Junior College Best Graduating Student and Excellence in Physics Award, 2004

Teaching & Mentoring Experience

Supervised/co-supervised over 20 researchers at the undergraduate to post-doctoral level.

Current:

- Arvind Balasubramanian (Texas Tech U.), Ph.D. student, 2019–
- Pranav Iyengar (IIT Mandi), B. Tech student, 2022–
- Prachee Mathur (IIT Mandi), B. Tech student, 2022–
- Kushagra Srivastava (IIT Mandi), B. Tech student, 2022–
- Arush Samadhia (IIT Mandi), B. Tech student, 2022–
- Muskan Rao (IIT Mandi), M.Sc. student, 2022–
- Aman Katira (IIT Mandi), M.Sc. student, 2022–

Past:

- Deven Bhakti (Texas Tech U.), undergrad, 2019–2020. Now Ph.D. student at U. Virginia.
- Dougal Dobie (U. Sydney), Ph.D. intern at Caltech, 2019. Now postdoc at Swinburne.
- Ian Brown (UW-Milwaukee), Ph.D. intern at Caltech, 2019
- Javed Rana (IUCAA, India), Ph.D. intern at Caltech, 2019. Now postdoc at Penn State U.
- Spheshele Makhathini (Rhodes/SKA, South Africa), Ph.D. intern, 2019. Now lecturer at Wits U.
- Amruta Jaodand, post-doctoral scholar at Caltech, 2019
- Jacob Hetrick (Maclaster), undergraduate intern at NRAO, 2019
- Marin Anderson, Ph.D. student and post-doctoral scholar at Caltech 2018–2019. Now at JPL.
- Lauren Rhodes, Ph.D. student at the University of Oxford, 2018/19
- Aprajita Hajela (Northwestern U.), Ph.D. intern at NRAO, 2018
- Dillon Dong, Ph.D. thesis at Caltech, 2017–2019
- Aleksandra Wolkowska, Ph.D. at Nicolaus Copernicus University, Poland, 2017–present
- Joe Bright, Ph.D. student at the University of Oxford, 2016/17. Now post-doc at Northwestern.

Mentored middle- and high-school students within the Pasadena Unified School District, 2012/13

Taught 6 courses on [[teaching feedback reports](#)]

- High Energy Astrophysics (guest lecturer at Caltech, 2019)
- Undergraduate and Graduate Cosmology (teaching assistant at Caltech, 2010/11)
- Undergraduate Physics labs (Caltech, 2011/12)
- Introductory Astrophysics (teaching assistant at Caltech, 2010/11)

Professional Services

- Reviewer for the UK STFC (funding agency); Nature, ApJ, A&A and MNRAS journals; GMRT, eMERLIN and Liverpool LT telescope proposals

- Co-chair of the VLA Sky Survey (VLASS) Implementation Committee
- Active member of the MeerKAT and SKA Transient Science Working Groups, the LIGO-Virgo-EM Observers Community and of the LISA Community
- Previously: Organized astrophysics seminars at the University of Oxford. Served at the NRAO Summer Research Program student selection process. Organized Radio Astronomy community meetings at Caltech/JPL.

Grants & Observing Programs

- NASA/XMM-Newton grant for Afterglows of Gravitational Wave (GW) Sources PI, \$70k
- NSF grant (AAG) for Multi-Messenger Astronomy (MMA) as PI, \$550k (2019–2022)
- NASA/SWIFT grant for transient follow up as PI, \$15k
- NASA/Chandra grant for EM-GW as co-I \$35k
- Australian Research Council grant for EM-GW/VLBI as co-I, AUD 480k (2019-2022)
- NSF AAG grant for investigating dual AGN as co-I, \$100k
- Radio: VLBI observing programs on the VLBA, HSA and eMERLIN as PI/co-PI >300 hours
- Radio: VLA for MMA/transients as PI/co-PI >500 hours and as co-I >1000 hours
- Radio: uGMRT, AMI and MeerKAT for transients/MMA as PI/co-I >5000 hours
- Sub-mm: ALMA, NOEMA, CARMA, SMA for MMA/X-ray Binaries/stars as co-PI/co-I >200 hours
- X-ray: Chandra, XMM-Newton and SWIFT for MMA/transients/AGN as PI/co-I >1000 ks
- Optical: Keck, Palomar, GTC and SALT for stellar/AGN/transients science as co-PI/co-I >30 nights

Selected Press Releases

- A Hubble constant measurement from superluminal motion of the jet in GW170817 ([NRAO News](#), [Princeton University News](#))
- Superluminal motion of a relativistic jet in the neutron-star merger GW170817 ([Caltech News](#), [NRAO News](#), [Sky & Telescope](#), [Scientific American](#), [SciAm Podcast](#))
- A mildly relativistic wide-angle outflow in the neutron-star merger event GW170817 ([Caltech News](#), [NRAO News](#), [NRAO Blogs](#), [Sky & Telescope](#))
- Discovery of the EM counterpart of the Neutron Star Merger GW170817 ([NRAO News](#), [Caltech News](#), [University of Oxford News](#))
- Discovery of rapid radio flaring in a white dwarf ([University of Oxford News](#), [R&D Magazine](#), [United Press International](#))
- Discovery of the black hole X-ray binary V404 Cygni in outburst ([University of Oxford News](#))

Talks

Gave more than 70 talks at conferences, seminars, colloquia, collaboration meetings and outreach events

Selected Conference Talks (invited)

<i>DSA-2000</i> , Radio Afterglows of Neutron Star Mergers	Virtual	01/2022
<i>VLA40</i> , Polarization View of Galactic Center	Virtual	08/2021
<i>Amaldi 14</i> , Physics & Cosmology from GW Events	Virtual	07/2021
<i>Marcel Grossman 16</i> , Physics & Cosmology from GW Events	Virtual	07/2021
<i>AAAS 2019</i> , Afterglows of GW Events	Washington D.C.	02/2019
<i>KITP Gravity and Light</i> , Radio Afterglow of GW170817	Santa Barbara, CA	02/2019
<i>AAS 233</i> , Radio Afterglow of GW170817	Seattle, WA	01/2019
<i>Marcel Grossman 15</i> , Radio Afterglow of GW170817	Rome, Italy	05/2018
<i>AAS 231</i> , The JAGWAR EM-GW Program	Washington D.C.	01/2018
<i>SKA/MeerKAT Transients</i> , Radio Afterglows of GW Events	Oxford, UK	11/2017
<i>Science with the SKA</i> , VLBI/Transients	Jodrell Bank, UK	09/2016
<i>Boutiques & Experiments</i> , Radio Transients in the GW Era	Caltech, CA	06/2016

<i>Science with the SKA</i> , Radio Transients	Cambridge, UK	04/2016
<i>Extragalactic Transients</i> , Radio & Optical Transient Surveys	Oxford, UK	11/2015
<i>Science with INTEGRAL</i> , Radio/X-ray view of V404 Cyg	Rome, Italy	08/2015
AAS 225, Dynamic Radio Sky (thesis)	Seattle, WA	01/2015
AAS 223, Dynamic Radio Sky	Washington D.C.	01/2014
<i>Locating Astrophysical Transients</i> , Radio Transients	Lorentz Center, NL	05/2013
AAS 221, Radio Transients	Los Angeles, CA	01/2013
<i>KITP/PTF Conference</i> , Radio & Optical Transients	Santa Barbara, CA	10/2012
<i>YERAC 2012</i> , Radio Variables and Transients	Puschino, Russia	09/2012

Colloquia and Seminars

Institute Colloquium on Neutron Star Mergers	IIT Mandi, India	03/2022
Astrophysics Colloquium on Neutron Star Mergers	Cornell U., NY	03/2022
Physics Colloquium on Multi-Messenger Astronomy (MMA)	IIT Kanpur, India	02/2022
Astrophysics Colloquium on VLA Sky Survey/Transients	U. Virginia, VA	09/2020
Astrophysics Colloquium on MMA	UC Berkeley, CA	11/2019
KIPAC seminar on GW170817	Stanford, CA	11/2019
Special CaJAGWR Seminar on GW170817	Caltech, CA	06/2019
Astrophysics Seminar on GW170817	U. Florida, FL	02/2019
IUCAA Colloquium on GW170817	Pune, India	11/2018
Astrophysics Seminar on GW170817	Columbia U., NY	08/2018
NRAO Colloquium on GW170817	Socorro, NM	05/2018
Jansky Symposium Seminar on Radio Transients	Socorro, NM	05/2018
Special Associated Universities Inc. Seminar on GW170817	Pasadena, CA	02/2018
Manchester Colloquium on GW170817 and GW-MMA	U. Manchester, UK	11/2017
Oxford Colloquium on GW170817	U. Oxford, UK	10/2017
Astrophysics Seminar on GW-MMA	U. Glasgow, UK	05/2017
Astrophysics Seminar on GW-MMA	U. Bath, UK	02/2017
Astrophysics Seminar on X-ray Binary V404 Cyg	U. Manchester, UK	10/2016
Astrophysics Seminar on X-ray Binary V404 Cyg	U. Cambridge, UK	10/2016
Special Seminar on GW-MMA (Multi-Messenger Astronomy)	U. Oxford, UK	09/2016
Special Seminar on VLA Sky Survey	NCRA/TIFR, India	12/2016
Special Seminar on Accretion and Jet Processes from WDs to BHs	TIFR, India	11/2016
Astrophysics Seminar on X-ray Binary V404 Cyg	PRL, India	12/2015
Astrophysics Seminar on X-ray Binary V404 Cyg	TIFR, India	11/2015
Astrophysics Seminar on X-ray Binary V404 Cyg	NCRA, India	11/2015
Astrophysics Colloquium on GW-MMA	IUCAA, India	10/2015
Astrophysics Seminar on Radio Transients	U. Oxford, UK	10/2015
Special Seminar on Orphan GRBs and NS Mergers	INAF Merate, Italy	09/2015
Astrophysics Seminar on Radio Transients	Swinburne, AU	11/2014
Special Seminar on Time Domain Radio Astronomy	IIA, India	11/2014
Special Seminar on Time Domain Radio Astronomy	NCRA/TIFR, India	11/2014
Astrophysics Seminar on Radio Transients	U. Sydney, AU	10/2014
Astrophysics Seminar on Radio Transients	Curtin U., AU	10/2014
Astrophysics Seminar on Dynamic Radio Sky	Radboud U., NL	05/2013
Astrophysics Seminar on Dynamic Radio Sky	U. Groningen, NL	06/2013
Astrophysics Seminar on Dynamic Radio Sky	U. Southampton, UK	06/2013
Lunch Talk on VLA/On-The-Fly Mapping	NRAO, NM	05/2012

Special Seminar on X-rays/Star Clusters
Astrophysics Seminar on X-rays/Star Clusters

IIT Bombay, India 05/2009
Caltech, CA 10/2009

Publications

Over 80 refereed publications, 12 as first author, 5 papers led by my students, over 7,600 citations, h-index 32 (June 2022). Over 130 non-refereed publications (GCN Circulars, Astronomer Telegrams and white papers). See [ADS](#) for the list.

Science Outreach

- Caltech Outreach, 2019–Present
- University of Oxford Astrophysics Outreach, 2015–2017
- Senior judge at the California Science Fair and Pasadena Unified School District Fair, 2011-2015
- Caltech Outreach (Venus Transit, M101 Supernova, etc), 2011–2014